Seals and Sealing in Canada's Northern and Arctic Regions

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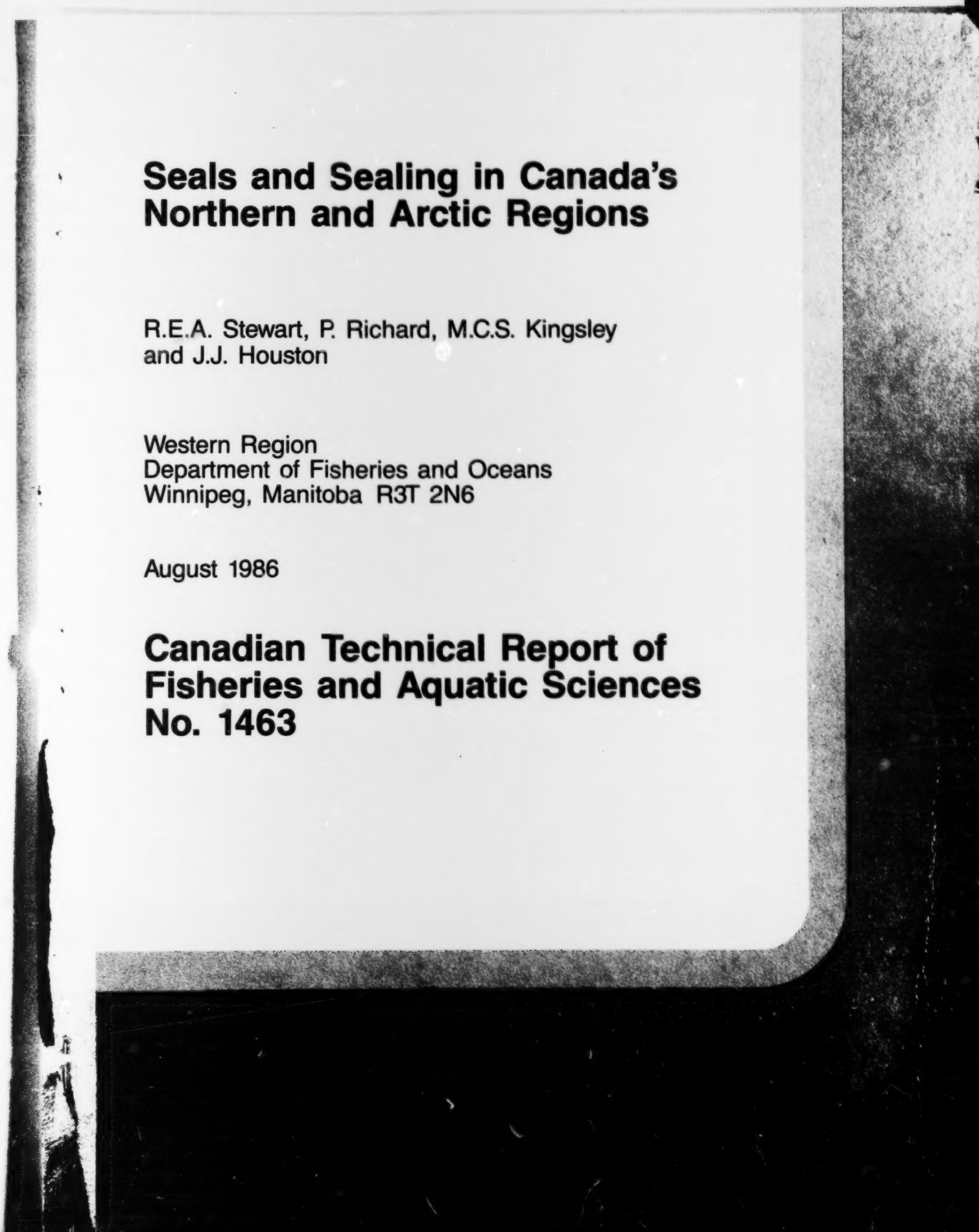

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Canadian Technical Report of
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SEALS AND SEALING IN CANADA'S NORTHERN AND ARCTIC REGIONS

by

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This is the 197 th Technical Report
from the Western Region, Winnipeg

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PREFACE

This is a revised version of a part of the Department of Fisheries and Oceans' brief to the Royal Commission on Seals and Sealing. That brief was prepared using data collated by J.J. Houston as part of a contract (FP802-4-2223) to the Department of Fisheries and Oceans, Ottawa.

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ABSTRACT

Stewart, R.E.A., P. Richard, M.C.S. Kingsley, and J.J. Houston. 1986. Seals and sealing in Canada's northern and Arctic regions. Can. Tech. Rep. Fish. Aquat. Sci. 1463: iv + 31 p.

This report is a revised version of Section 4 of the Department of Fisheries and Oceans' brief to the Royal Commission on Seals and Sealing. It outlines DFO's responsibilities in the context of northern sealing, some basic biological information on seal species harvested in northern Canada, and recent harvest statistics.

Ringed seals (Phoca hispida) and harp seals (Phoca groenlandica) are, numerically, the most important seal species hunted in northern Canada (84% and 12% of harvests, respectively). The bearded seal (Erignathus barbatus) ranks third (4%) but is culturally essential. Hooded seals (Cystophora cristata) and harbour seals (Phoca vitulina) are relatively unimportant. None of these species appears threatened at current northern exploitation rates but little is known about the stock or population of origin for seals specifically hunted in northern waters. Many biological parameters for local stocks are therefore assumed to be the same as for all stocks.

Local hunters in northern Canada harvested about 61 000 seals each year before 1983. Until recently, about 67% of this harvest was sold commercially for at least $520 000. Since 1983, the average price per skin and the number of skins sold have dropped dramatically. Harvests have also declined and the costs of hunting have greatly increased.

Northerners traditionally rely on seals for food, clothing and other aspects of their culture. They have become heavily dependent on the cash sale of seal skins to support this subsistence hunt which now relies on modern and expensive machinery. The future form of subsistence hunting rests largely on the fluctuations of the international fur markets.

Key words: seal harvest; Arctic Canada; economics; subsistence hunting; management.

RÉSUMÉ

Stewart, R.E.A., P. Richard, M.C.S. Kingsley, and J.J. Houston. 1986. Seals and sealing in Canada's northern and Arctic regions. Can. Tech. Rep. Fish. Aquat. Sci. 1463: iv + 31 p.

Ce rapport est une version révisée de la section 4 du mémoire présenté devant la Commission royale sur les phoques et leur chasse par le ministère des Pêches et Océans. Il traite des responsabilités du MPO en ce qui concerne la chasse aux phoques dans le Nord du Canada, de renseignements biologiques de base sur les espèces de phoque qui y sont captureés et de statistiques récentes sur ces prises.

Le phoque annelé (Phoca hispida) et le phoque du Gröenland (Phoca groenlandica) sont les deux espèces de phoque que l'on chasse le plus dans le Nord Canadien (respectivement 84% et 12% du total des prises). Le phoque barbu (Erignathus barbatus) vient au troisième rang (4%) mais est indispensable sur le plan culturel. Le phoque à capuchon (Cystophora cristata) et le phoque commun (Phoca vitulina) sont relativement peu importants. Aucune de ces espèces ne semble menacée par le taux actuel de leur exploitation dans le Nord. Cependant, on sait peu de choses sur leurs populations ou stocks d'origine. Par conséquent, on suppose que la plupart des paramètres biologiques de ces stocks locaux sont les mêmes que pour l'ensemble des stocks.

Avant 1983, les chasseurs locaux du Nord Canadien capturaient environ 61 000 phoques par année. Jusqu'à tout récemment, environ 67% de ces prises étaient vendus sur le marché et représentait une valeur marchande d'environ 520 000. Depuis 1983, le prix moyen des peaux et le nombre de peaux vendues ont baissé considéralement. Parallèlement, les prises ont baissé et les coûts de la chasse ont beaucoup augmenté.

Les habitants du Nord dépendent traditionnellement des phoques pour leur nourriture, leurs vêtements et pour certains aspects de leur culture. Ils sont devenus dépendants de la vente de peaux de phoques afin de pouvoir soutenir cette chasse de subsistance qui repose maintenant sur de la machinerie moderne et coûteuse. La forme que prendra la chasse de subsistance dépend dans une large mesure des fluctuations des marchés internationaux de fourrures.

Mots-clés: chasse au phoque; Arctique Canadien; économie; chasse de subsistance; gestion.

INTRODUCTION

Sealing in Canada has been a much publicized topic over the last decade, but attention has focussed primarily on the east coast seal hunt, not on the northern and Arctic harvest. In recognition of this, the main objectives of this report are:

1. to outline the Federal Government's mandate with respect to conservation and management of northern pinnipeds;
2. to summarize aspects of biology, population distribution, abundance, and reproductive rates of northern pinnipeds;
3. to present the best information available on seal harvest statistics for the Northwest Territories, northern Quebec and northern Labrador;
4. to collate information on commercial sealing, past and present, in Canada's northern and Arctic regions; and
5. to provide information on the nutritional and cultural aspects of seals and sealing.

MANAGEMENT OF SEALS

The Federal Government is the steward of marine mammals in Canada. Specifically, the key objective of the Department of Fisheries and Oceans (DFO) with respect to seals is:

> "to increase benefits from commercial fisheries, compatible with sustained productivity; - to ensure that aquatic environments are biologically fit to permit the maximization of social and economic benefits; - to foster a growing level of scientific and technological expertise in the marine sciences and . . . production in order that the greatest benefits accrue to Canada; - to have the capability of supplying scientific information and advice on the marine environment . . . especially in areas of resource development and exploitation; and - to maintain options for future use of the aquatic world." (Government of Canada 1985; page 2353, para 18,530).

Under the Government Organization Act (1979) and the Constitution Act (1982), the Federal Government has legislative responsibility for Canada's fisheries. The Minister of Fisheries and Oceans has been assigned responsibility for sea coast and inland fisheries, marine science, and administration of the Fisheries Act (1985). A part of Canadian fisheries management is the protection and management of seals and their habitat in Canadian waters. DFO operates under the authority of the Fisheries Act and attendant Seal Protection Regulations which specify the conditions under which seals may be harvested. Most of DFO's efforts to manage the harvest of seals have been directed toward the annual hunt for harp (Phoca groenlandica) and hooded seals (Cystophora cristata) off Canada's Atlantic coast and in the Gulf of St. Lawrence, and the provisions of the Seal Protection Regulations deal primarily with conditions for the harvest of these two species.

On the basis of differences in biological, cultural and harvesting factors, DFO has not followed the same regulatory management approach for the Arctic seal harvest as it has applied to the Atlantic coast seal hunt. The Department has recognized that maximizing economic benefits must assume a lower priority in the Arctic seal hunt than other objectives. To this end the Department has undertaken a low-level approach to regulatory management and has acted as a steward concentrating primarily on improving hunting practices through negotiations with Hunter and Trapper Associations (HTAs). The Keewatin Wildlife Federation and the Baffin Region Inuit Association harvest studies and statistics from fur sales and export permits provide the Department with a minimum estimate of actual landings. This method does not include pelts used domestically nor does it take into account hunting loss ratios. However, current efforts are directed to improving this information. Concomitantly, DFO is emphasizing the development of scientific and technical expertise required to protect the marine environment and its living resources.

DISTRIBUTION AND ABUNDANCE OF NORTHERN AND ARCTIC SEALS

Northern pinnipeds usually display one or more of Ehrenfeld's (1970) characteristics of a hypothetical "most endangered animal". Some or all are relatively large predators restricted in distribution, live in international waters, cross international or jurisdictional boundaries, and are commercially exploited. They all have long gestation periods, produce a maximum of one pup per year and may form large aggregations at various times of the year. All these features make them vulnerable to human activity. Based on this potential vulnerability, DFO supports and conducts research on the biology of marine mammals, particularly those harvested on a large scale.

The aspects of biology presented here are those most directly related to conservation and management: population distribution, abundance, and reproductive rates. Research into the population biology of Arctic pinnipeds is expensive and difficult. These seals inhabit remote and inhospitable environments; predation has made them shy and unapproachable; they cannot easily be observed, counted, or caught alive; their marine habitat prevents direct observation of mortality or feeding. Age at first reproduction is well known for most species, as are seasons of parturition and the approximate period of lactation. Pregnancy and birth rates have been estimated, but appear to vary from year to year and the values obtained are subject to unquantified errors due to the segregation of pregnant from non-pregnant females.

Age- and sex-segregation are features of mammalian populations and these complicate determination of overall age and sex structures. These data are available, however, for some defined areas, for some species. In general, the causes and rates of mortality have not been estimated accurately but some values have been

obtained conditional on assumptions of stable populations.

RINGED SEAL

The ringed seal (Phoca hispida) is circumpolar in distribution and the most abundant and widely-found pinniped in the Canadian north (Mansfield 1967, 1970; Mansfield et al. 1975; Smith 1973a). It occurs in Nettilling Lake, Baffin Island (King 1983; Mansfield 1967), along all the coasts of James Bay and Hudson Bay, throughout the Arctic archipelago, and along most of the Labrador coast (Frost and Lowry 1981; King 1983; Smith and Stirling 1975).

Ringed seals do not usually undertake extensive migrations but do move short distances during which they become segregated by age. In winter, mature animals tend to remain in areas of stable fast ice along complex coasts (Mansfield 1967; McLaren 1958a; Smith 1973a, 1976), which is their preferred breeding habitat (McLaren 1961; Smith 1976; Smith and Hammill 1980; Stirling and Calvert 1979). In the western Arctic, ringed seals may also breed offshore in stable pack-ice (Frost and Lowry 1981; Smith and Stirling 1975). At this time, immature ringed seals are found in peripheral, offshore ice and along simple coasts with less stable ice (Mansfield 1970; McLaren 1958a, 1966; Smith 1973a,b). During open water periods, ringed seals disperse pelagically, on a small scale (McLaren 1958a; Smith 1973c; Stirling et al. 1982), although sub-adults occasionally travel farther.

Although the sedentary nature of ringed seals reduces movements across jurisdictional boundaries, it may also lead to local overexploitation. The degree of exchange between groups of ringed seals is currently unknown and although five subspecies have been identified, no separate stocks have been defined (Stirling and Calvert 1979).

Population estimates of ringed seals are difficult to obtain. Since they are so widely dispersed, surveys must extrapolate from a small proportion of the habitat examined. Even within the survey area, only a portion of the animals are available for censusing while others are in a different habitat, hidden by ice, or in the water, depending on the season of the survey. Notwithstanding these limitations, there are general estimates available (Table 1) and others for more specific times and places have been published (McLaren 1958b, 1966; Stirling et al. 1977, 1982).

All these estimates must be qualified. Different surveying techniques have different biases and assumptions. Surveys from ships (Potelov 1975) may underestimate seal abundance (Mansfield 1970; McLaren 1958b). Both surface and aerial surveys are affected by weather, and observer position and capability (Burns and Harbo 1972; Finley et al. 1983; Kingsley and Lunn 1983; McLaren 1958b, 1961; Smith 1973b; Stirling et al. 1977, 1981). Aerial surveys have been made using various combinations of aircraft, altitude, and airspeed, each of which can affect population estimates (Smith 1973a, b). Seal behaviour also influences surveys which make assumptions about durations of dives, daily and seasonal haul-out patterns, sex, age, and seasonal differences in distribution, and behavioural reactions to the survey itself (Burns and Harbo 1972; Finley 1979; Finley et al. 1983; Frost and Lowry 1981; Mansfield 1970; McLaren 1958b, 1961, 1962; Smith 1973a, b, 1975; Smith and Hammill 1980). Surface surveys of subnivean birth lairs may be used to correct aerial surveys (Smith 1975; Smith et al. 1979a) but are themselves biased by population composition.

While the population estimates derived from this array of techniques are not always directly comparable, they all indicate a relatively stable population of ringed seals in the Canadian Arctic since the 1700-1800's (Davis et al. 1980; Stirling and Calvert 1979). They also indicate that improved censusing techniques and an increased understanding of ringed seal behaviour are needed to test the assumptions involved and to derive an estimate of absolute abundance.

Reproductive rates are expressed as ovulation, pregnancy or birth rates with each rate expected to be less than the previous one due to interrupted reproductive cycles. Ovulation rates of mature females vary between years from 0.39 to 0.74 in the eastern Beaufort Sea (Stirling et al. 1977) for an overall rate of 0.52. Other published ovulation rates are 0.80 to 0.97 (Marine ID 1983; Smith 1973a; Stirling and Calvert 1979).

Pregnancy rates, based on the presence of an embryo, range from 0.80 to 0.95 (McLaren 1962; Smith 1973a; Smith et al. 1979a). The only available crude birth rate is for an exploited population in Home Bay, Baffin Island and is 0.21 (Smith 1973a).

The ringed seal is ubiquitous and abundant, and inhabits fast ice, upon which humans can travel and live. It is the main prey of the much-studied polar bear (Ursus maritimus). Therefore, more is known about its life history and about patterns and rates of mortality than about those of other seals. Pups, born in lairs under snowdrifts (Smith and Stirling 1975) are preyed upon by Arctic foxes (Alopex lagopus) and when foxes are abundant, much of the seal production may be lost (Smith 1976). Polar bears also take pups, but perhaps incidentally to hunting the more nutritious adults (Stirling and McEwan 1975). Further high losses of sub-adults in fast ice areas are due to aggression from adults which drives the young seals out of the water onto the ice, where they starve, freeze, and are eaten (T.G. Smith, DFO, Ste. Anne de Bellevue, pers. comm). Higher densities of subadults may survive in loose-ice areas, but they may be in poor condition (M. Hammill, McGill University, Montreal, PQ, pers. comm.) and are preyed on by bears (Stirling et al. 1981). Walrus (Odobenus rosmarus) are also known to take some ringed seals and may find the naive young easier prey (Fay 1960; Lowry and Fay 1984). The polar bear also preys on adults in the fast ice, killing one seal every 4-5 days

(Stirling and Latour 1978). No ringed seal population estimation has been high enough to sustain the estimated number of bears in the area at these predation rates.

Estimates of maximum sustainable yields (MSY), which may serve as an upper limit of exploitation (Holt and Talbot 1978), range from 7% to 10% (Finley et al. 1983; Mansfield 1970; McLaren 1958b, 1962; McLaren and Mansfield 1960; Smith 1973c, 1975; Stirling and Calvert 1979). This would translate into 70 000 to 100 000 seals harvested each year in the eastern Arctic (Table 1). Again the variation in estimates warrants further research.

HARP SEAL

The world population of harp seals (Phoca groenlandica) occurs in three largely distinct stocks - the White Sea, the Jan Mayen and the Northwest Atlantic stocks (Sergeant 1965, 1976; Lavigne 1979). It is this last population which appears in Canadian and West Greenland waters (Sergeant 1965).

Northwest Atlantic harp seals whelp in the Gulf of St. Lawrence and off the coast of Newfoundland and Labrador in March (Fisher 1954; Sergeant 1965, 1976; Stewart 1983) and migrate north after moulting in April (Sergeant 1965). They are usually found north of Hamilton Inlet, Labrador, approximately from June through November (Lavigne et al. 1985). Within the Arctic regions, younger harp seals tend toward the west coast of Greenland while older ones move into Canadian waters (Sergeant 1965). There is also an apparent tendency within the Canadian Arctic for older harp seals to go farther north than younger ones (R. Stewart, unpublished data).

In summer, harp seals are commonly found throughout the eastern half of the Arctic archipelago, from Lancaster Sound to Hudson Strait and from the east coast of Baffin Island to the west end of Barrow Strait. They are less frequently seen in Foxe Basin and Hudson and James Bays. Some younger animals may stay north all year (Sergeant 1965).

There is as yet no consensus on population size (Table 2, see also Mohn 1979 and Winters 1979) although there is general agreement that if changes are taking place, they are gradual (Beddington and Williams 1979; Bowen and Sergeant 1983; Lavigne 1978, 1979; Lett and Benjaminsen 1977; Roff and Bowen 1981; Winters 1978), and would probably take many years of surveys to detect (Gerrodette 1984).

There are no estimates of the proportion of this population summering in the Canadian Arctic.

Mean ovulation rate of mature harp seals between 1957 and 1979 was 0.99 (Bowen et al. 1981) based on winter (Jan.-Feb.) and spring (Mar.-Apr.) samples. Fertility rates, the proportion of mature females pregnant in January and February, rose from about 0.85 to 0.94 between the early 1950's and late 1970's (Bowen et al. 1981). These authors indicate that the density-dependent responses they found in ovulation and fertility rates rely on meager data from the 1950's. Another possible bias may have been introduced by the sampling seasons used since pregnant seals may migrate to pupping and breeding areas before non-pregnant seals. Data from the Arctic suggest large year-to-year variation may occur in reproductive rates (R. Stewart et al. unpublished data). These data, collected over 4 years, also suggest an ovulation rate of 0.89 and a pregnancy rate of 0.88 ($n = 96$) in July-December. The very high pregnancy rates used to predict pup production may be over-estimates (but see Eberhardt and Siniff 1977).

Estimates of pup production in the Northwest Atlantic since 1975 range from about 128 000 to over 500 000 (Table 2). The Northwest Atlantic Fisheries Organization (NAFO) Scientific Council reported that, from a mark-recapture study in 1983, pup production in the Northwest Atlantic was estimated to be about 534 000 animals in 1983 and noted that these results supported the conclusion that pup production had probably increased since the late 1960's (Bowen and Sergeant 1985). Estimates of sustainable yields have ranged from 60 000 (Ricker 1975) to 510 000 (Bowen and Sergeant 1985) animals.

Inuit in the Canadian Arctic and residents of northern Labrador and Quebec harvest few harp seals compared with southern catches. In the 10 years following the introduction of southern quotas, 1971 to 1980, the southern hunt harvested an average of 162 000 harp seals per year compared with 9 770 caught annually in the Canadian Arctic and West Greenland (Bowen 1982). Over this time, the northern harvest has been 4.6% of the total Northwest Atlantic catch (Bowen 1982).

BEARDED SEAL (SQUARE-FLIPPER)

The bearded seal (Erignathus barbatus) has a circumpolar distribution and is a year-round resident in the Canadian Arctic (Mansfield 1967; Mansfield et al. 1975; Ray et al. 1982). The species is widely and thinly dispersed throughout the Canadian Arctic and the waters off northern Quebec and northern Labrador (Burns 1981); a small population off southern Labrador and Newfoundland has disappeared (Ray et al. 1982). The distribution of bearded seals is largely governed by the availability of pack ice and shallow water (Benjaminsen 1973; Ellis 1957; Finley and Renaud 1980; King 1983; Mansfield et al. 1975; McLaren 1958b, 1962; Ray et al. 1982; Smith 1980, 1981; Stirling 1975; Stirling et al. 1982) although they may, rarely, associate with fast ice in winter (Bradstreet 1982; Cleator and Smith 1984; Ellis 1957; Smith 1980, 1981; Smith et al. 1979b; Stirling et al. 1982). The bearded seal is usually solitary and is never found in large aggregations.

Two subspecies of bearded seal have been identified (King 1983). Erignathus b. barbatus (Erxleben 1777) is found in the North Atlantic and Hudson Bay and E. b. nauticus (Pallas 1811) is in the North Pacific and east into the Canadian Arctic. However, no clear geographic boun-

dary between the two has been distinguished (Burns 1981; King 1983; Stirling and Archibald 1979) and the following discussion applies to both subspecies.

Bearded seals may move long distances in association with drifting ice (Burns 1981) but the identification of stocks and degree of intermingling that may be associated with these movements is largely unknown. The relationship between bearded seals of West Greenland and those in Canada is unclear (Kapel and Petersen 1982). It is also unknown if bearded seals in one area of Canada mix with those of adjacent areas, for example, Hudson Bay and Foxe Basin or the Beaufort Sea and Amundsen Gulf.

There are no recent population estimates for bearded seals in their entire Canadian range (Burns 1981; King 1983; Stirling and Archibald 1979) although older or partial estimates are available (Table 3).

Estimates of ovulation rates vary from 0.46 to 1.0 depending on year and location (Smith 1981; Stirling et al. 1977). Pregnancy rates, based on corpora albicantia of recent pregnancies and post-implantation examination of reproductive tracts range from 0.33 to 0.85 (Burns 1967; Burns and Frost 1979; Smith 1981). Earlier authors however suggest that bearded seals reproduce in alternate years so mean pregnancy rates would be less than 0.50 (Chapskii 1938 and Sleptsov 1943 both cited by Burns 1981; Mansfield 1967; McLaren 1958a, 1962).

The general lack of data concerning population size, reproductive rates and mortality rates prevents definite estimation of sustainable yields although McLaren (1958b, 1962) suggested an MSY of 5%.

HARBOUR SEAL AND HOODED SEAL

These two species of seals occur infrequently in the Canadian north. The harbour seal found in Arctic Canada, Phoca vitulina concolor, ranges from Florida to north Baffin Island and into Hudson and James Bays (Bigg 1981) but the distribution is discontinuous (Bonner 1979). Another form, P. v. mellonae, which is of doubtful subspecific rank (Bonner 1979), occurs in lakes in northern Quebec (Bigg 1981; Bonner 1979).

Harbour seals are non-migratory (Bonner 1979) and occur in small groups near shore (Bigg 1981; Bonner 1979). This habit of occurring in small, widely scattered herds makes total population estimates difficult. There are probably about 400 000 to 500 000 P. vitulina in the world of which 40 000 to 100 000 are P. v. concolor (Bigg 1981). The number in Arctic Canada is 6 300 to 17 300 (Boulva 1975). There are no clear data on trends in population abundance, but it has been suggested that local populations are declining in areas of human activity (Bonner 1979).

Arctic stocks of harbour seals have not been defined. Bigg (1969) reported that 85-92% of mature females pupped each year in British Columbia (P. v. richardsoni). Mortality rates range from 0.12 to 0.43 depending on age class, sex and geographic region (Bigg 1969, 1981; Bonner 1979; Boulva 1971). Direct information concerning reproductive rates and mortality rates is not available for harbour seal populations in the Canadian Arctic.

Hooded seals (Cystophora cristata) associate closely with pack ice. They breed in large herds on pack ice near Jan Mayen, in the Greenland Sea, in the Gulf of St. Lawrence, off the coast of Labrador (the Front) and in Davis Strait (Sergeant 1974). The last concentration straddles the international boundary between Canada and Greenland. It is generally thought that hooded seals from all whelping areas migrate to the Denmark Strait to moult (Reeves and Ling 1981), but moulting animals are also found off northwest Greenland (Sergeant 1979). The summer range extends from Spitzbergen to Baffin Island (Reeves and Ling 1981).

Population parameters, stock of origin and vital parameters of hooded seals found in the Canadian Arctic are largely unknown. Recent population estimates for the Front and Davis Strait are about 400 000 (Anon. 1985). The pregnancy rates for mature females (4 years and older) was estimated to be 0.95 and mortality rates ranged from 0.14 to 0.27 (Anon. 1985). Pup production in 1984 (Front + Davis Strait) was estimated as 80 600 (95% CI: 54 800 - 110 400, Hay et al. 1985).

IMPORTANCE OF SEALS AND SEALING IN THE NORTH

Seal hunting by northern people includes aspects of a cash economy (hunt for export), a non-cash economy (hunt for domestic use), and cultural tradition. The approximate relative importance of export and domestic use of seals skins can be examined through comparisons of harvest and export statistics. When seal skins are sold commercially, they pass from the producer (hunter) through one or more wholesalers to the retailer and final consumer. This chain of events is vulnerable to a variety of human disruptions beyond the producer's control and is directly influenced by the international fur-buying market. The most obvious disruption in recent years was the embargo on the skins of seal pups (whitecoats and bluebacks) enacted by the European Economic Community (EEC) in 1982. This section outlines the harvest of seals and the commercial sale of seal products from northern Canada. It also briefly examines the domestic hunt in terms of nutritional and cultural contributions.

SEAL HARVEST

Several government and non-government organizations collect seal harvest statistics, but they use different methods of estimating and produce different estimates for the same species or community (Usher et al. 1985). DFO is developing standard reporting methods but in the interim, existing harvest estimates are the best available quantitative index for northern utili-

zation of seals. Existing estimates do not, however, indicate the full impact of harvesting on the species since they do not record hunting losses. The Baffin Region Inuit Association (BRIA), the Keewatin Wildlife Federation (KWF) and the Kitikmeot Hunters and Trappers Association (KHTA) provide seal harvest statistics for 28 communities in the Northwest Territories. The average annual harvest of all seal species in the Northwest Territories (1981-83) was about 44 000 seals (Appendices 1 to 3). Most communities for which data are available took fewer than 1 500 seals each year but two took over 4 500 (Table 4).

The harvesting of seals has been assessed for 16 of 18 communities in northern Quebec by the Inuit and Cree "Native Harvesting Research Committees" (NHRC). The average annual seal harvest in northern Quebec was about 13 400 between 1976 and 1980 (Appendices 4 and 5) with most communities having an estimated harvest of less than 1 500 seals (Table 5). Research of NHRC indicated that the communities of Kuujjuarapik, Inukjuak, Salluit and Kangiqsujuaq are the most dependent on seals. In 1984 the Inuit and Cree of northern Quebec negotiated a guaranteed level of harvesting of marine mammals based on these average levels and subject to the conservation principle as stated in the James Bay Agreement.

Seal harvest statistics from northern Labrador are a collation of commercial sales and estimates of the domestic harvest made by Federal Fisheries officers. The communities of northern Labrador harvested about 3 500 seals each year (1980-1984), mostly ringed seal, known locally as "jar"; fewer harp seals are harvested. Most of these settlements landed about 600 seals annually (Table 6).

Summarizing these data indicates about 61 000 seals were landed each year in the late 1970's and early 1980's in the North. Harvests for which the information is available show this catch was 83.7% ringed seal, 11.8% harp seal, 4.4% bearded seal, 0.2% harbour seal and 0.02% hooded seal (Appendices 1, 4 and 6).

COMMERCIAL SEALING

The Hudson Bay Company (HBC) is the largest buyer of seal pelts in the Canadian north (Appendix 7). Most of these skins are sent to auctions in Europe (Copenhagen, Frankfurt, London, Leningrad), but each year HBC also holds four or five auctions in Toronto at which seal skins are sold. Recently, cooperatives in the NWT and northern Quebec have also bought seal skins from hunters. Usually these organizations handle fewer skins than HBC, pay the hunter less than the HBC, and process and use some skins locally for garment and handicraft industries. The commercial sale of seal skins within northern Labrador has been almost completely through the Labrador Northern Services Division of the Northern Development and Operations Branch of the Government of Newfoundland since the early 1970's although HBC buys seal skins in Rigolet and Northwest River when the market conditions are favourable.

The commercial sales records show a pattern similar to the harvest statistics: the ringed seal has provided a significant cash income for many years for many northerners (Wenzel 1978). Between 1961-62 and 1980-81, approximately 36 000 seal skins worth about $456 000 were sold each year in the NWT (Table 7). Most seal exports originated in the eastern Arctic (Appendices 7 and 8) where the communities of Pangnirtung and Broughton Island account for a large proportion of seals (Table 8). The average annual seal production in northern Quebec (10 communities) was 2 200 seals between 1978-79 and 1980-81 (Table 9). Before 1981-82, the commercial hunt in northern Quebec was worth about $62 000 annually (Table 9). Between 1973 and 1981, four communities in northern Labrador sold an average of 2 700 seal skins annually (Table 10). Commercial sealers in northern Labrador received between $25.00 and $75.00 per pelt (Williamson, Memorial University, St. John's, NF, pers. comm.).

After the EEC ban, in 1982, on the import of whitecoat and blueback skins, the harvest and commercial sales figures changed markedly in the North. In the NWT, commercial sales since 1981-82 have averaged 15 700 seals and $258 000, down by 56% and 43% respectively (Table 7). In Quebec, sales were down by 51% in the number of seals and 71% in cash value (Table 9). In 1983, prices in northern Labrador were about $10.00 per pelt (Table 11) and in 1984 no set price was established.

As prices for seal pelts declined, the costs associated with seal hunting have increased. Inuk hunters are dependent on expensive hunting equipment (Usher 1981; Wenzel 1978) imported into the North (Table 12). Some items in Table 12 have more than doubled in cost since 1972-73. Other important items such as fuel and spare parts, are not shown. Seals, in particular the ringed seal, provided a marketable commodity, but the rising costs of equipment may cause subsistence hunting methods to alter drastically if the benefits are to outweigh the costs. An analysis of hunting economics of two communities reflects these changes (Table 13). It is apparent that the economic profit from seal hunting in the North has shrunk considerably in the last few years.

To offset the depressed market value of seal pelts, DFO implemented a seal pelt price support program in 1982, through its "Fisheries Prices Support Board", similar to the one offered to Atlantic coast sealers. The program costs for the 1982-83 and 1983-84 seasons in the NWT were approximately $88 000 and $49 000 respectively, giving an average of about $6.00 per seal skin to the hunters. The GNWT has also paid a subsidy of $5.00 for all seal pelts sold since the 1983-84 season.

DOMESTIC USE OF SEALS

Estimating the number of seals used locally by subtracting estimates of commercial sales from estimates of harvest (e.g. Table 4 - Table 8) is crude at best. In addition to the errors associated with these two estimates,

there are discrepancies in the years for which the data are available and the manner in which they are reported (fiscal or calendar year). With this caveat in mind, it appears that about 20 000 seals are used locally each year. Although the data are few, it also seems that export sales have declined more rapidly than harvest levels (Tables 6, 7, 9 and 10, and Appendices 1 to 6). Data on the proportion of seals used for different purposes (food, clothes, ropes and tarpaulins, dog food, fox bait, etc.) are largely unavailable.

Alton-Mackey (1981) examined seal harvesting for domestic use along with other country foods in two northern Labrador communities, Makkovik (population 333) and Rigolet (population 262). Seals were important as food in both these communities, contributing 23% of country food eaten (by weight) in Rigolet and 11% in Makkovik. Ringed seals provided the largest volume of seals in Makkovik; ringed seals and harp seals were equally important in Rigolet.

The traditional use of marine mammals by Inuit is well established. For example, Berger (1977), in the MacKenzie Valley Pipeline Inquiry, recognized the importance of subsistence harvesting activities (including seals) for Inuit and other northern Natives as means of providing high quality food. Seal meat contains more high quality protein and less crude fat than that of domestic animals such as beef, pork and fish (Table 14) (Boles et al. 1982). The fat present is relatively unsaturated and the meat is a rich source of iron and Vitamin A.

Less obvious but equally important is the cultural aspect of seal hunting. For all these people, hunting seals is an essential aspect of their culture. Long-term community studies (Nelson 1969, 1981; Wenzel 1976, 1978, 1983) reinforce this idea by stating that, regardless of the external fluctuations in the ringed seal market, Inuit in the communities studied (Wainwright, Alaska and Clyde River, NWT) remained highly dependent on seals for their premium subsistence value.

Additionally, each seal species has its own role in this cultural identification. Ringed seals, especially young ones, are an important source of food throughout the Arctic. Older ringed seals are used for dog food. Prime skins have represented a source of cash in an ever-expanding cash economy, either through direct sale or through handicrafts. They are also used to make kamiks (boots) and other clothing for local use. Some of the poorest skins may be used as tarpaulins.

In the eastern Arctic, few harp seals are eaten but they are sought for food in Labrador and Quebec. Their skins had value as cash equivalents and were used locally for kamiks and tarpaulins; they were preferred for kayak building.

The bearded seal is taken in small numbers throughout northern Canada but the harvest statistics belie its cultural significance. The meat is eaten and some organs are considered delicacies. The skin is essential for the soles of kamiks and there is some inter-settlement trade in it for this purpose. It also makes excellent rope.

The killing of seals will probably remain part of our northern heritage because of both material necessity and a traditional work ethic among hunting societies. Whether this harvest will also provide a fair monetary return on the hunter's investments depends on world fur markets.

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Table 1. Ringed seal (Phoca hispida) population estimates.

Area	Habitat	Population Estimate 000's	Source
NE Atlantic & Arctic Ocean		6-7 000	Stirling and Calvert 1979
Eastern Canadian Arctic		1 000	McLaren 1958b, 1962
Baffin Island	fast ice		Smith 1975
- Home Bay		70.7	
- Hoare Bay		36.4	
- Cumberland Sound		58.8	
East Baffin Island	fast ice	67-177	Finley et al. 1983
	pack ice	417-787	Finley et al. 1983
Hudson Bay		455	Smith 1975
James Bay		61	Smith 1975
Viscount Melville Sound		408.4	Smith et al. 1979a
Barrow Strait, Peel Sound		3 300	Smith et al. 1979b
Beaufort Sea		21.7-61.3	Stirling et al. 1977, 1982
Eastern Beaufort Sea		36.3-76	Kingsley and Lunn 1983
Belcher Islands		70	McLaren and Mansfield 1960

Table 2. Estimates of population size and pup production of Northwest Atlantic harp seals (Phoca groenlandica).

Estimated Population 000,000's	Pup Production 000's	Year	Basis for Estimate	Source
	300	1966	model	Ricker 1975
1.1	310	early 1970's	survival index	Winters 1978
0.6-0.8	126±71.3 to 158±99.7 (±95%CI)	1975	aerial photography -UV	Lavigne et al. 1982
	200	1975	aerial photography, age frequencies, marking	Sergeant 1975
≈1.2		1976	model	Benjaminsen and Lett 1976
	250±50 (±95%CI)	1977	aerial photography (partial coverage) UV	Lavigne et al. 1980
0.7-1.2	193-321	1977	predicted from model	Capstick et al. 1976
	350	1977	survival index	Winters 1978
	506±77 (±1SE)	1978	mark-recapture	Bowen and Sergeant 1983
	460	1978	predicted from survival index	Winters 1978
1.5-2.0 (1+)	380-500	1977-80		Anon. 1983
	489±71 (±1SE)	1979	mark-recapture	Bowen and Sergeant 1983
	534±33 (±1SE)	1983	mark-recapture	Bowen and Sergeant 1985

Table 3. Population estimates of bearded seals (Erignathus barbatus) in Canada.

Area	Estimate 000's	Source
Eastern Canadian Arctic	185	Mansfield 1958b
includes:		
east Hudson Bay	36	
Foxe Basin	37.7	
Cumberland Sound, Frobisher Bay	12.9	
Hudson Strait (Quebec)	6.6	
Beaufort Sea (1974)	2.8±0.7	Stirling et al. 1977
(1975)	1.2±0.2	
Beaufort Sea (1974)	3.1	Stirling et al. 1982
(1975)	1.4	
(1978)	3.1	
(1979)	2.1	
Tuktoyaktuk Peninsula and Mackenzie Delta Shelf (1981)	0.7	Kingsley and Lunn 1983
(1982)	1.3	

Table 4. Average annual seal harvest for communities in the Baffin and Keewatin region and reported seal harvest for communities in the Kitikmeot region (see Appendices, I, II, III for details).

Harvest Level	Number of Communities	Community
1-500	12	Hall Beach, Resolute Bay, Chesterfield Inlet, Rankin Inlet, Eskimo Point, Whale Cove, Bathurst Inlet, Cambridge Bay, Pelly Bay, Baker Lake, Gjoa Haven, Nanisivik
500-1 500	6	Grise Fiord, Igloolik, Repulse Bay, Coral Harbour, Spence Bay, Coppermine
1 500-2 500	6	Arctic Bay, Cape Dorset, Frobisher Bay, Lake Harbour, Sanikiluaq, Holman
2 500-3 500	2	Clyde River, Pond Inlet
3 500-4 500	0	
4 500-5 500	1	Broughton Island
5 500-6 500	0	
6 500+	1	Pangnirtung

Table 5. Average annual estimated seal harvests in communities of northern Quebec (see Appendices IV and V).

Seals Harvested	Number of Communities	Community
1-500	6	Aupaluk, Tasiujaq, Fort George, Wemindji, Eastmain, Fort Rupert
500-1 500	6	Akulivik, Quaqtaq, Kangiqsuk, Kuujjuaq, Kangiqsualujjuaq, Killiniq
1 500-2 500	3	Kuujjuarapik, Inukjuak, Salluit
2 500-3 500	1	Kangiqsujuaq

Table 6. Annual average seal harvest (all species) for communities in northern Labrador (1980-1984). (see Appendix VI for details).

Harvest Level	Number of Communities	Community
1 - 500	3	Goose Bay/Happy Valley, Postville, Hopedale
500 - 1 500	4	Rigolet, Northwest River, Makkovik, Nain

Table 7. Seal pelt production in the Northwest Territories from 1961 to 1984.

Year	Number of Pelts	Average value returned to hunter ($)	Total Value
1961-62	10 470	4.65	48 686
1962-63	27 884	8.49	236 735
1963-64	46 962	14.78	691 707
1964-65	68 332	11.08	757 119
1965-66	51 197	5.97	305 646
1966-67	46 355	6.82	316 141
1967-68	19 460	3.82	73 948
1968-69	27 479	7.68	211 039
1969-70	31 185	8.64	269 384
1970-71	37 282	9.22	343 832
1971-72	30 819	9.81	302 334
1972-73	26 363	15.10	398 081
1973-74	36 391	17.36	631 748
1974-75	40 468	17.10	692 003
1975-76	34 270	23.65	810 486
1976-77	48 407	16.99	822 435
1977-78	26 726	11.86	316 970
1978-79	29 352	14.16	415 785
1979-80	30 860	19.05	588 023
1980-81	42 120	21.13	890 298
1981-82	24 556	19.41	476 948
1982-83	14 837	14.86	220 590
1983-84	7 689	9.96	76 581

Table 8. Average annual commercial seal pelt production (all species) for communities in the Northwest Territories (see Appendix VII).

Average Annual Seal Pelt Production	Number of Communities	Communities
1-500	20	Grise Fiord, Hall Beach, Resolute Bay, Sanikiluaq, Port Burwell, Chesterfield Inlet, Rankin Inlet, Eskimo Point, Whale Cove, Bathurst Inlet, Cambridge Bay, Pelly Bay, Spence Bay, Baker Lake, Gjoa Haven, Aklavik, Inuvik, Paulatuk, Sachs Harbour, Tuktoyaktuk
500-1 500	7	Arctic Bay, Cape Dorset, Igloolik, Lake Harbour, Pond Inlet, Repulse Bay, Coral Harbour
1 500-2 500	2	Frobisher Bay, Coppermine
2 500-3 500	2	Clyde River, Holman Island
3 500-4 500	0	
4 500-5 500	1	Broughton Island
5 500-6 500	0	
6 500+	1	Pangnirtung

Table 9. Commercial seal skin sales in communities in northern Quebec, 1978 to 1984.

COMMUNITY	1978-79		1979-80		1980-81		1981-82		1982-83		1983-84	
	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value
Ivujivik	64	1 664	484	14 036	117	3 393	105	1 785	2	20	-	
Kangiqsualujjuaq	-	-	60	1 740	62	1 798	154	2 618	-		-	
Akulivik	-	-	4	116	27	783	82	1 394	-		-	
Salluit	118	3 068	541	15 689	140	4 060	481	8 177	7	70	-	
Povungnituk	1	26	1	29	5	145	-		-		-	
Kuujjuarapik	250	6 500	500	14 500	527	15 283	128	2 176	2	20	8	
Kangiqsujuaq	916	23 816	1 076	31 024	1 102	31 958	1 059	18 003	19	190	2	
Kuujjuaq	-	-	32	928	32	928	3	51	-		-	
Kangiqsujuaq	73	1 898	152	4 408	82	2 378	59	1 003	-		-	
Inukjuak	110	2 860	62	1 798	54	1 566	67	1 139	-		-	
TOTAL	1 532	39 832	2 911	84 419	2 148	62 292	2 138	36 346	30	300	10	
Average price per pelt	26.00		29.00		29.00		17.00		10.00			

(Source: Ministère du Loisir, de la Chasse et de la Pêche).

Table 10. Commercial purchases of seal skins by the Labrador Northern Services Division.

	Number of seal skins purchased				
Year	Nain	Makkovik	Postville	Hopedale	Total
1973	1 455	281	73	107	1 916
1974	1 561	615	102	98	2 376
1975	1 692	934	141	494	3 261
1976	1 781	757	105	108	2 751
1977	989	556	108	1120	2 773
1978	1 473	376	109	614	2 572
1979	1 079	748	149	939	2 915
1980	1 016	521	125	858	2 520
1981	2 204	N/A	292	453	(2 949)
1982	1 161	292	396	623	2 472
1983	194	396	94	264	948
					27 453

N/A: Not available

Table 11. Seal pelts purchased by the Labrador Northern Services Division (July 1 - June 30).

	79/80			80/81			81/82			82/83			83/84		
	N	$	$/N	N	$	$/N	N	$	$/N	N	$	$/N	N	$	$/N
Harp	3 579	118 294	33.05	6 184	228 080	36.88	4 331	132 557	30.61	4 268	113 145	26.51	1 287	21 403	16.63
Ringed	26 907	460 647	17.12	33 848	615 217	18.18	19 921	337 492	16.94	10 310	105 143	10.20	6 314	54 237	8.59
Other	374	9 055	24.21	2 088	46 980	22.50	304	6 949	22.86	259	2 302	8.89	88	941	10.69
Total	30 860	587 996	19.05	42 120	890 277	21.14	24 556	476 998	19.42	14 837	220 590	14.87	7 689	76 581	9.96
# Hunters	-			2 129			1 812			730			569		

(Source: GNWT Department of Renewable Resources)

Table 12. Capital Costs of Hunting, Clyde River, N.W.T., in 1972-73, 1976-77 and 1983-84.

Item	1972-73[1] (dollars)	1976-77[1] (dollars)	1983-84[2] (dollars)
Snowmobile[3]	1 400.00	2 500.00	3 898.00
Trail motorcyle (2 wheels)	-	1 150.00	-
(3 wheels)	-	-	2 100.00
Outboard motor (25 h.p.)	900.00	1 100.00	-
(55 h.p.)[4]	-	-	2 998.00
22-foot (6.7 m) canoe	1 200.00	1 800.00	2 595.00
.303 Enfield rifle	99.00	150.00	-
.222 Remington rifle	150.00	250.00	659.00
.22 semi-automatic rifle	60.00	73.00	368.98
20 shells for .303 rifle	7.00	10.00	18.50
20 shells for .222 rifle	5.00	7.50	11.50
20 shells for 12-gauge shotgun	9.00	11.00	11.60
Fox trap	1.00	2.50	4.00
Duffle (for winter clothing) per metre	8.75	13.10	28.00

1 1972 and 1976 item costs have rounded from Clyde River prices (Wenzel 1978).

2 1984 costs are exact as charged by the Clyde River Hudson's Bay Company store (Wenzel pers. comm.).

3 Snowmobile prices reflects the cost of the most popular model present in Clyde River in each of the sample years.

4 This larger engine is now the most common in Clyde River, replacing the smaller 25 h.p.

Table 13. Economic return derived from seal pelts in the western and eastern Canadian Arctic (July 1 - June 30).

Economic Factor	WESTERN ARCTIC: Holman				EASTERN ARCTIC: Broughton Island			
	1980/81	81/82	82/83	83/84	1980/81	81/82	82/83	83/84
Number of hunters	65	60	58	66	91	101	80	81
Number of Ringed seal skins sold	5 702	2 294	1 497	1 348	3 943	4 274	1 622	1 419
Number of Harp seal skins sold	-	-	-	-	335	181	63	217
Number of "other" seal skins sold	-	-	8	-	1	-	-	-
Average number of seal skins sold per hunter	88	38	26	20	47	44	21	20
Total value of seal skins ($)	110 591	51 097	21 757.50	18 998	76 856	79 570	16 160	12 023
Average value per pelt	19.39	22.27	14.29	14.09	19.96	17.86	9.59	7.34
Average earnings derived from seal skins sold per hunter ($)	1 701.4	851.61	375.13	287.85	844.57	787.82	202.00	148.43
Percent change in average earnings derived from seal skins per hunter since 1980/81		-49.95	-77.95	-83.08		-6.71	-76.08	-82.43

(Source: Department of Renewable Resources, NWT)
Season: July 1 to June 30

Table 14. Representative nutritional composition of 100 grams of various meats

	Protein (g)	Fat (g)	Calcium (mg)	Phosphorous (mg)	Iron (mg)	Niacin (mg)	Thiamine (mg)	Riboflavin (mg)	Source
Ringed Seal	30	0.7	48	300	20	5.5	0.23	0.74	Boles et al., 1982
Beef	17	25	11	161	2.2	4.4	0.07	0.15	Boles et al., 1982
Chicken	21	4	9	220	1.5	6	0.1	0.15	Osborne and Voogt, 1978
Beef Liver	19	6	10	350	17	15	0.4	3.5	Osborne and Voogt, 1978
Seal Liver	24	2.7	44	398	13.5	12.7	0.45	2.3	Heller and Scott, 1967
Haddock	17	0.4	30	210	0.8	3	0.05	0.08	Osborne and Voogt, 1978
Herring	17	15	100	250	1.5	3.5	0.02	0.09	Osborne and Voogt, 1978

Appendix 1. The Baffin Region Inuit Association's estimated seal harvest levels for 1981 to 1983.

Community	Year	Number of Hunters	Ringed Seal	Bearded Seal	Harp Seal	Hooded Seal	Harbour Seal	Total	Estimated Average Annual Harvest
Arctic Bay	1981	93	1 560	20	41	0	0	1 621	
	1982	95	1 820	48	86	0	0	1 954	2 060
	1983	89	2 458	60	86	0	0	2 604	
Broughton Island	1981	90	5 700	110	92	0	0	5 902	
	1982	92	4 370	59	97	2	0	4 528	4 840
	1983	99	3 699	38	348	3	1	4 089	
Cape Dorset	1981	149	2 190	234	6	0	3	2 433	
	1982	193	2 220	211	6	0	3	2 440	2 292
	1983	168	1 802	177	21	0	2	2 002	
Clyde River	1981	98	3 730	60	28	1	0	3 819	
	1982	98	2 565	17	8	0	0	2 590	3 201
	1983	105	3 148	32	15	0	0	3 195	
Frobisher Bay	1981	255	2 170	87	168	5	29	2 459	
	1982	248	2 130	79	153	0	1	2 363	
	1983	217	1 360	36	74	0	0	1 470	2 097
Grise Fiord	1981	24	771	27	207	0	0	1 005	
	1982	26	776	11	115	0	0	902	946
	1983	21	723	23	185	0	0	931	
Hall Beach	1981	70	891	83	1	0	0	975	
	1982	87	361	76	0	0	0	437	851
	1983	85	969	154	11	0	6	1 140	
Igoolik	1981	114	1 330	68	1	0	0	1 399	
	1982	108	1 270	71	6	0	0	1 347	1 486
	1983	96	1 559	133	14	1	5	1 712	
Lake Harbour	1981	61[1]	1 910	121	22	3	4	2 060	
	1982	62	1 210	83	6	0	12	1 311	1 645
	1983	54	1 461	89	14	0	1	1 565	

Appendix 1. (cont'd)

Community	Year	Number of Hunters	Ringed Seal	Bearded Seal	Harp Seal	Hooded Seal	Harbour Seal	Total	Estimated Average Annual Harvest
Nanisivik	1981	21	480	4	0	0	0	484	
	1982	17	440	8	3	0	0	451	432
	1983	16	352	3	7	0	0	362	
Pangnirtung	1981	148	5 180	131	4 630	1	0	9 942	
	1982	166	5 320	54	4 580	3	0	9 957	8 652
	1983	190	4 310	84	1 658	5	1	6 058	
Pond Inlet	1981	125	2 010	20	7	4	0	2 042	
	1982	142	4 070	27	56	5	0	4 158	3 100
	1983	131	N/A	N/A	N/A	N/A	N/A	N/A	
Resolute Bay	1981	33	188	7	0	0	0	195	
	1982	38	233	4	3	0	0	239	233
	1983	31	249	16	0	0	0	265	
Sanikiluaq	1981	61	2 890	139	0	0	0	3 029	
	1982	76	2 110	138	0	0	3	2 251	2 472
	1983	79	2 093	40	0	0	2	2 135	
Outpost camps[2]	1981	178	5 000	168	1 060	0	53	6 281	
	1982	66	3 240	78	730	2	15	4 065	5 173
Total	1981	1 358	36 000	1 279	6 263	14	89	43 652	
	1982	1 514	32 135	964	5 849	12	34	38 992	36 742
	1983	1 381	24 183	885	2 433	9	17	27 528	

[1] Excludes women in 1981
[2] There were 26 in 1981, 25 in 1982
N/A Not Available

(Sources: Donaldson 1983, 1984; J. Pattimore pers. comm. for 1983 estimated harvests)

Appendix 2. Estimated harvest of seals in the Keewatin Region, Northwest Territories

Community	Period	Estimated Number	Harvest Period	Estimated Number
Baker Lake	Nov. 81-Sept. 82	-	Nov. 82-Sept. 83	1
Chesterfield Inlet	Jan., Feb., Aug., & Sept. 82	48	Oct. 82-Sept. 83	137
Coral Harbour	Oct. 81-Sept. 82	977	Oct. 82-Sept. 83	-
Eskimo Point	Oct. 81-Sept. 82	448	Oct. 82-Sept. 83	278
Rankin Inlet	Nov. 81-Sept. 82	465	Oct. 82-Sept. 83	469
Repulse Bay	Oct. 81-Sept. 82	836	Oct. 82-Sept. 83	360
Whale Cove	Oct. 81-Sept. 82	134	Oct. 82-Mar. 83	57

(Source: Gamble 1984)

Appendix 3. Reported harvest of seals in the Kitikmeot Region, Northwest Territories

Community	Reported Harvest[1]	Hunter Response[2] (mean ± S.D. in %)	Time Period
Bay Chimo/Bathurst Inlet	26	95 ± 8.6	Jan. 83-Dec. 83
Cambridge Bay	112	79 ± 20.4	Oct. 82-Nov. 83
Coppermine	549	55 ± 20.3	Feb. 83-Dec. 83
Gjoa Haven	371	52 ± 17.6	Sept. 82-Nov. 83
Holman Island	1665	71 ± 22.3	Oct. 82-Nov. 83
Pelly Bay	339	89 ± 13.5	Oct. 82-Nov. 83
Spence Bay	1044	85 ± 20.8	Sept. 82-Nov. 83

[1] Estimated harvest not available.
[2] Proportion of hunters contacted each month

(Source: Jingfors 1984)

Appendix 4. Estimated seal harvests by northern Quebec Inuit communities*, 1976-1980.

Community	Year	Ringed Seal	Bearded Seal	Harp Seal	Harbour Seal	Total	Estimated Average Annual Harvest
Kuujjuarapik (Poste-de-la-Baleine) (Great Whale River)	1976	3 276	107	2	1	3 386	
	1977	2 114	66	2	0	2 182	
	1978	1 282	42	0	2	1 326	1 988
	1979	1 375	92	8	1	1 476	
	1980	1 452	111	5	0	1 568	
Inukjuak	1976	2 833	198	11	9	3 051	
	1977	2 671	194	3	0	2 868	
	1978	1 281	71	0	22	1 374	2 285
	1979	1 776	204	12	3	1 995	
	1980	1 842	285	11	0	2 138	
Akulivik (Cape Smith)	1976	956	101	3	0	1 060	
	1977	842	63	2	0	907	773
	1978	210	59	1	0	270	
	1979	839	143	11	0	993	
	1980	530	105	1	0	636	
Salluit (Sugluk)	1976	2 591	180	43	0	2 814	
	1977	2 623	95	23	2	2 743	
	1978	787	71	8	0	866	1 905
	1979	1 264	138	25	0	1 427	
	1980	1 482	155	39	0	1 676	
Kangiqsujuaq (Maricourt) (Wakeham Bay)	1976	4 740	213	58	6	5 017	
	1977	2 624	92	61	0	2 777	
	1978	1 313	64	27	1	1 405	2 816
	1979	2 451	98	15	1	2 565	
	1980	2 195	95	18	8	2 316	
Quaqtaq (Koartac)	1976	1 117	64	8	5	1 194	
	1977	725	49	14	0	788	
	1978	281	11	1	0	293	665
	1979	499	39	9	0	547	
	1980	462	37	4	0	503	
Kangiqsuk (Bellin) (Payne Bay)	1976	781	124	7	0	912	
	1977	495	122	2	0	619	
	1978	243	71	2	0	316	508
	1979	246	92	1	0	339	
	1980	239	90	23	0	352	

Appendix 4. (cont'd)

Community	Year	Ringed Seal	Bearded Seal	Harp Seal	Harbour Seal	Total	Estimated Average Annual Harvest
Aupaluk (Hopes Advance Bay)	1976	278	37	4	0	319	
	1977	125	15	0	0	140	
	1978	106	18	0	0	124	201
	1979	258	37	1	1	297	
	1980	106	17	0	0	123	
Tasiujaq (Leaf-Bay)	1976	481	56	0	1	538	
	1977	209	25	0	4	238	
	1978	122	21	0	3	146	249
	1979	92	18	1	0	111	
	1980	184	26	0	1	211	
Kuujjuaq (Fort Chimo)	1976	706	119	2	3	830	
	1977	718	131	1	3	853	
	1978	318	58	4	1	381	584
	1979	414	36	4	1	455	
	1980	303	86	2	12	403	
Kangiqsualujjuaq (Port-Nouveau-Québec) (George River)	1976	1 446	127	34	6	1 613	
	1977	772	62	20	2	856	
	1978	374	35	1	5	415	794
	1979	363	93	0	1	457	
	1980	502	91	6	31	630	
Killiniq (Port Burwell)	1976	652	70	100	6	828	789
	1977	530	40	178	2	750	
Fort-George (Chisasibi)	1976	2	0	0	0	2	
	1977	0	0	0	0	0	
	1978	20	2	0	0	22	9
	1979	21	0	0	0	21	
	1980	0	0	0	0	0	
TOTAL	1976	19 859	1 396	272	37	21 570	
	1977	14 448	954	306	13	15 721	
	1978	6 337	523	44	34	6 938	13 094
	1979	9 598	990	87	8	10 683	
	1980	9 297	1 098	109	52	10 556	

* The members of the communities of Povungnituk and Ivujivik, and approximately half of the members of the Salluit community did not take part in the survey.
(Sources: NHRC, Inuit, 1979, 1982a, 1982b)

Appendix 5. Estimated annual seal harvest by northern Quebec Cree communities from 1975-1979.

Community	1975-76	1976-77	1977-78	1978-79	Annual Average Harvest
Kuujjuarapik (Great Whale River)	224	175	130	50	144.75
Chiaasibi (Fort George)	252	212	257	156	175.4
Wemindji	62	91	83	69	61
Eastmain	0	11	13	2	6.5
Fort Rupert	2	1	0	0	1

(Sources: N.H.R.C., Cree, 1976, 1978, 1979, 1980.)

Appendix 6. Total landings of seals in northern Labrador, 1980-1984.

Community	Year	Ringed Seal	Harp Seal	Other	Total	Average Annual Estimated Harvest
Rigolet	1980	-	119	564	683	
	1981	223	2 090[1]	5	2 318	
	1982	-	50	166	216	708
	1983	139	61	53	253	
	1984[2]	59	1	13	72	
Goose Bay/	1980	-	20	580	600	
Happy Valley	1981	7	-	1	8	
	1982	151	-	-	157	169
	1983	-	1	79	80	
	1984[2]	-	-	1	1	
Northwest	1980	-	128	1 271	1 399	
River	1981	397	102	1	500	
	1982	-	1	257	258	603
	1983	173	14	69	256	
Makkovik	1980	-	429	1 558	1 987	
	1981	304	69	5	378	
	1982	-	662	180	842	675
	1983	35	10	10	55	
	1984[2]	4	107	-	111	
Hopedale	1980	-	466	807	1 243	
	1981	459	272	7	738	
	1982	-	40	92	132	449
	1983	33	-	8	41	
	1984[2]	-	93	-	93	
Postville	1980	-	48	97	145	
	1981	159	19	3	181	143
	1982	-	71	32	103	
Nain	1980	-	852	1 270	2 122	
	1981	376	223	4	603	
	1982	-	454	133	587	727
	1983	3	-	-	3	
	1984[2]	230	87	-	319	
Total	1980	-	2 062	6 147	8 179	
	1981	1925	20 775	26	4 726	
	1982	310	1 226	860	2 295	3474
	1983[3]	383	86	219	688	
	1984[2]	293	288	14	596	

[1] Exceptional ice conditions allowed a high harp seal harvest in 1981 (Boles et al., 1982).
[2] 1984 figures are preliminary. No data was available for Postville and Northwest River.
[3] 1983 figure not available for Postville.

Appendix 7. Number of seal pelts sold to Hudson's Bay Company in northern Labrador, western, central and eastern Arctic from 1941 to 1984.

YEAR	WESTERN ARCTIC	CENTRAL ARCTIC	EASTERN ARCTIC	NORTHERN LABRADOR	GRAND TOTAL	EASTERN ARCTIC % OF TOTAL
1941		24	5 549		5 573	99.6
1942			2 101		2 101	100.0
1943			1 825		1 825	100.0
1944			4 178		4 178	100.0
1945			4 500		4 500	100.0
1946			3 434		3 434	100.0
1947	86	326	9 290		9 702	95.8
1948	13	461	12 378		12 852	96.3
1949	34	745	9 683		10 462	92.6
1950	299	910	4 578		5 787	79.1
1951	409	184	3 900		4 493	86.8
1952	96	309	4 952		5 357	92.4
1953	541	479	6 017		7 037	85.5
1954	619	659	8 380		9 658	86.8
1955	425	604	10 112		11 141	90.8
1956	236	480	10 331		11 047	93.5
1957	926	640	10 326		11 892	86.8
1958	702	988	9 898		11 588	85.4
1959	391	837	12 084		13 312	90.8
1960	626	1 051	11 689		13 366	87.5
1961	1 521	1 815	14 989		18 325	81.8
1962	1 354	1 121	16 370		18 845	86.9
1963	6 471	6 147	36 902		49 520	74.5
1964	14 390	9 471	43 213		67 074	64.4
1965	16 514	9 207	46 595		72 316	64.4
1966	9 087	5 475	37 384		51 946	72.0
1967	4 713	3 880	23 485		32 078	73.2
1968	2 838	1 589	19 351		23 778	81.4
1969	7 829	6 840	35 281		49 950	70.6
1970	6 923	4 228	27 262	1 446	39 859	68.4
1971	7 592	3 993	25 855	854	38 294	67.5
1972	5 495	3 511	20 129	672	29 807	67.5
1973	5 814	4 143	25 214	621	35 792	70.4
1974	5 362	3 935	28 693	627	38 617	74.3
1975	3 486	3 770	34 809	1 049	43 114	80.7
1976	2 897	2 284	29 408	429	35 018	84.0
1977	2 068	1 350	28 987	440	32 845	88.3
1978	3 230	1 846	21 327	625	27 028	78.9
1979	4 841	1 255	22 838	81	29 015	78.7
1980	6 041	2 281	26 632	1 075	36 029	73.9
1981	4 980	1 458	22 382	1 281	30 101	74.4
1982	1 717	504	15 519	425	18 165	85.4
1983	1 154	184	9 422	432	11 192	84.2
1984	372	23	4 097	371	4 863	84.2

(Sources: Hudson's Bay Company, December 27, 1984 and July 25, 1985.)

Appendix 8: Average annual commercial seal pelt production for communities in the Northwest Territories, 1973 to 1982 (n = number of years averaged).

REGION PINNIPEDS

Baffin	Harp	n	Ringed	n	Other	n
Arctic Bay	29.6	9	813.9	10	145.4	9
Broughton Island	214.0	8	4 932.0	9	550.6	9
Cape Dorset	8.5	6	836.2	9	428.6	9
Clyde River	18.9	7	2 379.3	9	516.0	8
Frobisher Bay	115.4	9	1 117.7	10	379.4	9
Grise Fiord	68.0	9	257.0	9	81.9	7
Hall Beach	29.1	7	205.1	9	101.6	7
Igoolik	8.0	7	1 391.3	9	304.9	9
Lake Harbour	13.3	8	1 103.3	9	154.5	9
Pangnirtung	2 531.3	9	7 318.4	9	985.5	9
Pond Inlet	16.3	8	892.8	9	193.5	8
Resolute Bay	0.5	6	66.5	8	14.0	7
Sanikiluaq	0.4	5	351.4	9	57.8	8
Port Burwell	25.2	4	165.2	4	6.5	4
Subtotal	3 078.5		21 830.1		3 920.2	
Keewatin						
Chesterfield Inlet	2.5	6	45.3	6	77.8	9
Repulse Bay	30.5	6	760.0	8	213.5	8
Coral Harbour	21.6	7	516.5	8	206.3	9
Rankin Inlet	-	-	18.0	8	41.4	8
Eskimo Point	1.0	7	87.0	9	67.4	8
Whale Cove	0.0	5	35.3	6	60.2	9
Subtotal	55.6		1 462.1		666.6	
Kitikmeot						
Bathurst Inlet	0.0	5	34.7	6	0.2	6
Cambridge Bay	1.6	5	50.6	7	27.4	8
Pelly Bay	0.2	6	210.7	9	113.5	8
Spence Bay	0.2	5	310.6	8	58.6	9
Baker Lake	0.0	6	0.9	8	49.9	8
Gjoa Haven	9.2	6	110.9	9	63.0	8
Coppermine	3.5	6	1 606.7	10	127.6	8
Holman Island	3.2	6	2 543.5	10	246.4	7
Subtotal	17.9		4 868.6		686.6	
Inuvik						
Aklavik	0.0	3	18.8	4	4.0	4
Inuvik	0.0	3	1.0	4	0.0	3
Paulatuk	0.0	3	43.0	5	27.3	4
Sachs Harbour	0.0	3	73.6	5	62.3	4
Tuktoyaktuk	0.0	3	12.6	5	14.7	6
Subtotal	0.0		149.0		108.3	
GRAND TOTAL	3 152.1		28 309.8		5 381.7	